Accuracy of a Health Interview Survey In Measuring Chronic Illness Prevalence

by John R. Moore Jr.

The accuracy of a houshold health interview survey in measuring the prevalence of chronic illness was tested by comparing survey responses with the same respondents' medical records. Results indicate that the survey is far from a perfect discriminator of recorded medical status. The false-positive rate was 25 percent, and the rate of false negatives was nearly 40 percent. False positives were greater for Mexican-Americans and other nonwhites than for white respondents. The household health interview survey is nonetheless an important planning tool since it reflects respondents' perceived health levels, which may be used to predict utilization of primary medical services.

An understanding of relationships underlying the utilization of personal health services is prerequisite to the intelligent planning of local medical care delivery systems and the formulation of national and regional health policy; accordingly, a good deal of research has been done on the many factors that influence the amount and type of services used. A research bibliography recently compiled by Aday and Eichhorn [1] lists 207 studies on the utilization of personal health services, most of which have appeared within the past ten years.

At the heart of this research literature are studies of the relationships between utilization and a variety of socioeconomic variables. Results from these studies have been applied to many policy determinations and management decision problems. Fox [2] indicates that results from utilization studies are valuable inputs to federal policy decisions on the use of financing and supply programs to improve access to medical care for the poor. Congressional testimony draws heavily on the effects of income and insurance on utilization of care for the support of national health insurance programs. In separate studies, Abernathy and Moore [3] and Hershey and Moore [4] illustrate how utilization research has been used in the planning and management of a community health services delivery system.

Because of its relationship with utilization, the prevalence of chronic illness

is an important factor that should be considered in studies of community health services requirements. Research by Andersen [5] and Richardson [6] indicates that need for care is the most significant determinant of the utilization of personal health services. Of the various indicators of need, chronic illness was found by Gaspard and Hopkins [7] to contribute the most to the use of physicians' services. In addition, health services planning studies by Hilleboe [8] and Moore [9] point out the value of knowing the areas of greatest need for care so that appropriate organizations and programs can be developed to serve these needs.

Most of what is known about health services utilization has been learned through field studies using household interview techniques. Interviews and their related questionnaires have come to be regarded as reliable instruments for collecting demographic and historical utilization data, but less is known about the instruments' ability to produce valid measures of the prevalence of illness, particularly chronic illness. The National Center for Health Services Research and the National Center for Health Statistics have pioneered in the use of "two-week-based" instruments and "critical ratios" that attempt to measure the prevalence of illness and disability in a study area, but adequate validity testing of these devices has not been reported.

This article analyzes the accuracy of data from a household health interview survey in measuring the prevalence of chronic illness. This analysis was possible because medical records covering nearly three years were available for some of the respondents.

Data Sources

The data reported below were gathered in March 1972 as part of a comprehensive health services survey of the San Joaquin Valley town of Livingston, CA, and the surrounding rural area. Slightly more than 12,000 persons live in the area under study. A sample drawn randomly from a recent census listing of the study area yielded 1,065 respondents from 315 families. The survey instrument was a multipurpose questionnaire administered by trained interviewers; average interview length was 75 minutes. Primary areas of concern in the survey were family health history, utilization of personal health services, and attitudes regarding illness and medical care. A detailed description of the community, the survey methodology, and the instrument is available in ref. 10.

A respondent was classified as having a chronic condition if he reported having a specific health problem for more than three months. This classification is a measure of perceived need for care. Since this measure may be weakened by its self-reporting nature, the survey instrument was structured to lead the respondent through discussions of his various activity-limiting health problems in a way that would separate recent problems from those of a long-term nature. Thus the respondent could focus on a specific current problem rather than try to recall his entire health history.

Table 1. Percentage of Respondents Reporting Chronic Condition During Past Year, by Age and Sex

Sex	Age group			
	Under 17	17–44	Over 44	Total
Both sexes	18.2	28.8	50.8	31.4
	(373)*	(385)	(303)	(1061)
Male	17.3	31.1	54.1	32.4
	(196)	(193)	(148)	(537)
Female	19.2	26.6	47.7	30.2
	(177)	(192)	(155)	(524)

* Number in parentheses indicates total number of respondents in age group.

The accuracy check was possible because more than one-fourth of the survey respondents were patients of Livingston Community Health Services, Inc. (LCHS), a community-owned not-for-profit corporation formed in 1970 to provide primary medical services to all residents of the Livingston area.

As part of a comprehensive health services research study conducted by the Stanford Health Services Research Group, information is collected for every patient visit to the LCHS clinic. Diagnoses were coded using the ICDA (International Classification of Diseases, Adapted) system, and a code was used to provide unique identification of each patient. Health records data are stored along with survey responses in an information system that permits comparison across data sources. Details of the information system are available in refs. 4 and 10.

The accuracy of data from the survey was checked by comparing survey responses dealing with chronic illness for each individual with ICDA codes from that person's LCHS medical record. The National Center for Health Statistics' classification of chronic illnesses was used in making the comparison. Obviously, if a respondent had not visited the LCHS clinic as a patient, there would be no medical record and thus no comparison would be possible. The validity analysis is therefore incomplete in that only a limited percentage of the responses could be verified.

Table 2. Respondents Reporting Chronic Illness and Having LCHS Medical Records

Racial or ethnic group	Respondents with diagnosed chronic illness		Respondents with no diagnosis of chronic illness		All respondents reporting chronic illness	
	Number	Percent	Number	Percent	Number	Percent
All	73	68.9	33	31.1	106	100
Mexican-American	24	66.7	12	33.3	36	100
White	33	73.3	12	26.7	45	100
Other	16	64.0	9	36.0	25	100

Table 3. Respondents Reporting Chronic Illness and
Using LCHS as Regular Care Source

Racial or ethnic group	Respondents with diagnosed chronic illness		Respondents with no diagnosis of chronic illness		All respondents reporting chronic illness	
	Number	Percent	Number	Percent	Number	Percent
All	42	75.0	14	25.0	56	100
Mexican-American	11	64.7	6	35.3	17	100
White	20	80.0	5	20.0	25	100
Other	11	78.6	3	21.4	14	100

Verification of Survey Responses

Nearly one person in three reported some form of chronic illness; 31.4 percent of the sample, or 333 respondents, were recorded as having a specific health problem for over three months. Table 1 summarizes self-reported chronic illness by age and sex. A more detailed analysis of the patterns of prevalence according to income, race, insurance coverage, and occupation is available in ref. 11.

Of the 333 respondents who were classified as having a chronic condition, 106 had LCHS medical records and could therefore be considered in this analysis. Seventy-three, or 68.9 percent, of these respondents had chronic illness diagnoses as part of their LCHS medical records (see Table 2).

These results suggest that the survey approach to measurement of chronic illness prevalence is far from perfect as a measure of true health status. But then, of course, the procedure for checking accuracy is also imperfect. It is possible that respondents who were LCHS patients and actually had chronic disorders went to non-LCHS physicians for treatment of these problems, in which case chronic illness diagnoses would not appear on these patients' LCHS medical records.

To check this possibility, a separate accuracy analysis was performed using only those respondents who indicated in the survey interview that they regarded LCHS as their primary source of medical care, on the assumption that medical records for these respondents would reflect more closely their true health status with regard to chronic illness.

The results of this analysis, given in Table 3, show a slight lessening in the gap between self-reported and diagnosed chronic illness. For the reduced sample, 75 percent of the respondents reporting chronic illness had diagnosed chronic illness. The 25 percent "false positives" may indeed have been chronically ill but simply did not appear as such on LCHS records. Closer examination of these patients' records showed frequent clinic visits for non-chronic but nonetheless long-term problems such as hay fever, dermatitis, and gallstones.

The data were examined by racial and ethnic group in an attempt to determine whether the survey results were more accurate for one group than

Table 4. Respondents Reporting No Chronic Illness
and Having LCHS Medical Records

Racial or ethnic group	Respondents with diagnosed chronic illness		Respondents with no diagnosis of chronic illness		All respondents reporting no chronic illness	
	Number	Percent	Number	Percent	Number	Percent
All	66	38.4	106	61.6	172	100
Mexican-American	23	32.9	47	67.1	70	100
White	24	35.3	44	64.7	68	100
Other	19	55.9	15	44.1	34	100

for another. As Tables 2 and 3 indicate, there was a notable tendency for the survey results to be more accurate for white respondents than for either of the remaining respondent groups. Since the differences are not statistically significant due to the small sample and cell sizes involved, interpretation of the findings must remain largely conjecture. Taken at face value, the data in Tables 2 and 3 suggest that Mexican-Americans are more likely than whites to report chronic conditions that they do not have. The data are not consistent with regard to nonwhites; the false-positive rate for nonwhites is 36.0 percent in Table 2—even higher than for Mexican-Americans—but only 21.4 percent in Table 3. Again, however, cell sizes were very small.

The rather high false-positive rate was accompanied by an even higher rate of false negatives, as shown in Table 4. Of the respondents who had LCHS medical records and reported no chronic illnesses, 38.4 percent actually had diagnosed chronic conditions. The rate of false negatives was roughly the same for Mexican-Americans and whites (32.9 percent and 35.3 percent, respectively) and was highest for nonwhites (55.9 percent). The false-negative rate did not change materially when the analysis was limited to respondents using LCHS as their regular source of care.

These results appear to be further evidence of the inaccuracy of self-reporting in measuring the prevalence of chronic illness. Some qualification of the high rate of false negatives is necessary, however. Some conditions that are properly categorized as chronic, such as arthritis and osteoarthritis, are possibly not perceived by respondents as serious or long-term illnesses. Further, these two diagnoses are a substantial proportion of the false-negative rates shown in Table 4. When these two conditions are eliminated from the chronic category, the accuracy analysis results in a false-negative rate of under 10 percent.

Conclusion

Before passing judgment on self-reporting in measuring the prevalence of chronic illness, it is important to ask how the measure is to be used. For definitive screening of individual cases, measures based on self-reporting leave much to be desired. However, it is unlikely that such an approach

would be used for this purpose, since health interview surveys have their greatest potential in explaining utilization patterns and as guides for planning new health care delivery programs. LCHS, for example, used survey responses to identify areas of need for care within its community and to estimate staff requirements through utilization predictions based on the amount of chronic illness reported [4,10].

The key to the use of survey information for delivery system planning is that responses be accurate *predictors* of the phenomena of interest to planners. This is different from requiring that responses be accurate indicators of the true health states of individuals. The household health interview survey of chronic illness prevalence indicates how the community in the aggregate *perceives* its health status. If perception of ill health, regardless of the diagnostic realities, motivates individuals to seek care, then such a measure will be a good predictor of utilization.

In fact, for the Livingston community, this was the case. A previous report [12] found that respondents reporting long-term illnesses had significantly higher rates of access to and utilization of health services than respondents reporting no long-term illnesses. The average number of annual physician visits per person was 250 percent higher for the former group of respondents. The survey approach to measurement of prevalence of chronic illness has been found to be correlated with historical utilization and a valuable predictor of LCHS staff requirements.

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